

EXPLOSIVES SAFETY

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Safely transporting explosives and ammunition can be a challenge. Materials can be transported by land, air, and sea. Each mode of transport has a list of advantages and a list of problems. This article will discuss only the method of transporting explosives by land.

Personnel performing cargo operations must contend with many factors including the weight and size of objects, the strength of material used for securing cargo to the floor or to other cargo, and momentum. One of Newton's laws of physics explains that objects in motion continue to stay in motion unless acted upon by an external force. Guidelines for dealing with the forces of momentum are based on physics, common sense, and the U.S. Army AMC 19-48 series drawing, Apr 98, Index of U.S. Army Unitization, Storage and Outloading Drawings for Ammunition and Components, which details procedures for moving every configuration of ammunition load by motor vehicle transportation. By following proper procedures, the people working with the explosives will be safe and the shipment will be completed in a safe and timely manner.

Personnel involved in the loading of explosives and ammunition for land transportation must be knowledgeable of blocking, bracing, and tie-down procedures. Additional sources for information on blocking and bracing are:

b. DAP 385-64, 28 Nov 97, Ammunition and Explosives Safety Standards.

c. TM 9-1300-200, Oct 69, Ammunition, General.

The purpose behind these requirements is to assure that:

a. Cargo is loaded on the center-of-balance of semi-trailers and other cargo vehicles and then secured with blocking and tie-downs as appropriate.

b. Movement of the load is minimized by using materials strong enough to withstand the abuse they will receive from rough roads and sudden stops. In order to ensure that loads are safe, a loaded vehicle is tested with several passes over a course of rail ties, driven 30 miles on unimproved roads, driven over a washboard course designed to bounce materials out of position, and then subjected to panic stops.

c. Cargo is to be retained within the walls of the vehicle or tied to the bed. The cargo should not extend outside of the bed of the truck.

Defense Ammunition Center (DAC), Transportation Engineering Division, provides AMC 19-48 series drawings depicting acceptable configurations for blocking and bracing military ammunition for motorized land transportation. The index of the drawings may be ordered at <http://www.dac.army.mil/det/dapam/toc.html>, or from the Director, Defense Ammunition Center, ATTN: SIOAC-DET, Savanna, IL 61074-9639. Copies of many of the drawings are also available as a downloadable print file (Hewlett-

a. 49 Code of Federal Regulations.

Packard Laser Jet III format), or may be ordered by these methods:

- a. Commercial phone (815) 273-8927.
- b. DSN 585-8927.
- c. E-mail: sioacdet@dac-emhl.army.mil.
- d. Mail: Director, Defense Ammunition Center,
ATTN: SIOAC-DET, Savanna, IL 61074-9636.

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CARE OF M40 FIELD PROTECTIVE MASK

Inspection of personal protective equipment (PPE) prior to performing any work task is imperative. On the average work site, we are talking about leather gloves, safety glasses, or some type of back support as examples. Working in and around chemical facilities, the M40 mask is without a doubt, the most important item of PPE that you will be issued.

A quick inspection/preventive maintenance check of your mask should only take a matter of minutes if you are familiar with it. DO NOT depend on other personnel to inspect your mask. It is also wise practice to go over your mask at more frequent intervals than once a month or worse yet – once a quarter. Following is a quick checklist that can help in the inspection of your mask. Refer to TM 3-4240-339-10, 1 Feb 94, Chemical-Biological Mask: Field, M40, Small, Medium, Large; Chemical-Biological Mask: Field, M40A1, Small, Medium, Large for details.

(Insert picture of mask here.)

Proper storage can help prolong the life of the mask. As good practice, store it with the faceform if stored over 30 days, as rubber tends to take the shape in which it is stored. A crease or bend in the rubber could become permanent and cause an area where contamination can enter due to an inadequate seal. It is also important to put the mask back in the carrier the correct way. The drinking tube coupling can shear and the face piece can get cut if a mask is stored like the old M17 – folded in the middle, with a canister in the face cavity, or with the eye lenses facing towards the body. There is no fix for a sheared drinking tube coupling or a cut in the face piece and the mask must be replaced. Masks should be inspected for a sheared drinking tube coupling and cuts in the face piece at the 6 o'clock position of the inlet valve housing.

Other mask storage tips:

- a. Stow mask carrier with eye lenses facing away from your body.
- b. Do not fold your M40 mask.
- c. Do not store anything in the face piece.

Optical inserts don't always fit as well as designed. This can be taken care of with a slight modification: (Refer to TB 43-PS-538, Sep 97, The Preventive Maintenance Monthly).

- a. Use ordinary pliers to bend the rubber coated ends of the retainer outward. They should take on more of an "L" shape on the end rather than a "hook" shape.
- b. When installing the inserts, the retainer ends should touch the mask eyewall.

Harness clips should be inspected along with all other items of the mask for serviceability. With use, paint chips off the clips. Lack of paint leads to corrosion. Touch up chipped clips with black lacquer, NSN 8010-00-085-0559. Refer to TB 43-PS-538.

Hearing while wearing the M40 mask can pose a problem. Personnel with any hearing impairment add to this problem. When wearing the M40 mask, hearing problems can be helped by ordering and using amplifiers, NSN 5895-01-381-9012. Refer to TM 3-4240-339-10.

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ARMY POLICY DIRECTS REPORTING OF EXPLOSIVES AND CHEMICAL MISHAPS TO THE DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD (DDESB)

The DOD Directive 6055.7, Mishap Investigation, Reporting, and Recordkeeping, and the DOD Directive 6055.9, DDESB and Department of Defense (DOD) Component Explosives Safety Responsibilities, require that DDESB receive notification of serious ammunition and explosives/chemical mishaps.

Army policy for reporting Army explosives and chemical mishap(s) is set forth in:

Memorandum, DA, DACS-SF, 13 Jan 98, subject: Notification of DDESB for Explosives and Chemical Agent Mishaps. Policy memorandum provides guidance/requirements, which are in addition to those provided in AR 385-40, 1 Nov 94, Accident Reporting and Records. Memorandum assigns the following specific responsibilities:

a. Commanders of installations and activities with an explosives or chemical agent mission will:

(1) Explosives Mishaps:

(a) Ensure notification (during duty hours) of explosives mishaps is made to the U.S. Army Technical Center for Explosives Safety (USATCES).

(b) Ensure a follow-up report for explosives mishaps is made to USATCES within two workdays of the initial notification.

(2) Chemical Agent Mishaps:

(a) Ensure notification (during duty hours) of chemical agent mishaps in accordance with chemical event reporting requirements of AR 50-6, 1 Feb 95, Chemical Surety.

(b) Ensure a follow-up report of chemical agent mishaps is made to the Office of the Director of Army Safety (ODASAF) within two workdays of initial notification.

b. The USATCES will:

(1) Provide notification (during duty hours) of explosives mishaps to the Chairman, DDESB.

(2) Provide a follow-up report of explosives mishaps, within two workdays of initial notification, to the Chairman, DDESB.

c. The ODASAF will:

(1) Provide notification (during duty hours) of chemical agent mishaps to the Chairman, DDESB.

(2) Provide follow-up report for chemical agent mishaps, within two workdays of initial notification, to the Chairman, DDESB.

The memorandum requires that telephonic and electronically transmitted reports be provided to the USATCES (explosives mishaps) and ODASAF (chemical agent mishaps) as soon as possible and that reports include as much of the following data as may be immediately available.

a. Name and location of reporting activity.

b. Name, title, and telephone number of person reporting and a contact at scene of the accident.

c. Location of the mishap (activity, city, installation, building number or designation, road names, or similar information).

d. Item nomenclature (MK, Mod, FIIN, DODAC, or NALC).

e. Quantity involved (number of items and the net explosives weight [NEW]).

f. Day, date, and local time of initial significant event when discovered.

g. Description of the significant event (include type of operation involved).

h. Number of fatalities (military, DOD civilian, or other civilian) and persons injured.

i. Description and cost of material damaged (government or non-government).

j. Cause (if known).

k. Action planned or taken (corrective, investigative, or EOD assistance).

l. Effect on production, operation, mission, or other activity.

m. Details of any remaining chemical agent hazard or contamination, if applicable.

n. Are any news media aware (yes or no).

It is of the highest priority that initial explosives/chemical mishap notification (with available information) be completed. Initial notification saves valuable hours frequently lost in validating non-official, inaccurate mishap reports.

Definitions:

a. **Explosives mishap** – An unplanned explosion or functioning of explosives material or devices (except in combat). This includes inadvertent actuation, jettisoning, and releasing or launching explosives devices. It also includes mishaps that result from off-range impacts of ordnance.

b. **Chemical agent mishap** – Any unintentional or uncontrolled release of a chemical agent when:

(1) Reportable damage occurs to property from contamination, or costs are incurred for decontamination.

(2) Individuals exhibit physiological symptoms to agent exposure.

(3) The agent quantity released to the atmosphere is such that a serious potential for exposure is created by exceeding the applicable maximum allowable concentration-time levels for exposure of unprotected workers or the general population.

Initial and follow-up notifications will be made (during normal duty hours) to:

a. **Explosives mishaps:**

U.S. Army Technical Center for Explosives Safety
DSN: 956-8919
Comm: (918) 420-8919
Datafax DSN: 956-8503
Datafax Comm: (918) 420-8503
E-mail: es-hotline@dac-emh2.army.mil

b. **Chemical agent mishaps:**

Director of Army Safety
DSN: 225-7294
Comm: (703) 695-7294
Datafax DSN: 227-4055
Datafax Comm: (703) 697-4055
E-mail: pattojt@hqda.army.mil

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UNEXPLODED ORDNANCE (UXO) CLEANUP PROJECTS DELAYED

Several UXO cleanup projects have been delayed, but the delays were avoidable! Why did they happen? The installation didn't get an explosives safety submission approved before startup.

If you're going to perform a UXO cleanup, call us and inform us about it. We can tell you if you need to make a submission. If you do, we'll tell you what the submission requires and where to send it.

Both the Army and Department of Defense Explosives Safety Board (DDESB) have recently published useful guidance on UXO cleanup submissions. We can e-mail you copies if you call and request them.

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MUNITIONS RULE IMPLEMENTATION POLICY: RECOMMENDED READING!

The Environmental Protection Agency (EPA) Munitions Rule has done us a great favor. It says that as long as we follow our own ammunition storage rules, we can store waste munitions in our magazines without EPA imposing all kinds of new requirements on us. But we have to follow our own storage rules! This means no waivers, no violations, and no deficiencies! Each magazine has to have an approved Department of Defense Explosives Safety Board (DDESB) site plan, meet quantity distance (QD) and compatibility, and pass all magazine inspections and tests with flying colors. Otherwise, we have to let EPA "help" us run our waste munitions storage!

Did you know that if the magazines that you are using to store waste munitions lack DDESB-approved site plans, EPA could fine your installation? Even minor deficiencies such as an inadequate bond between the magazine door and the grounding system could also trigger fines. To find out more about requirements for magazines used to store waste munitions, get a copy of DOD's implementation policy for the Munitions Rule. If you don't have a copy, call your major subordinate

command (MSC) or major Army command (MACOM) Safety Office now and get one!

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NEW HAZARD DIVISION (HD) 1.2 STANDARDS

On 18 Aug 98, the Department of Defense Explosives Safety Board (DDESB) held its 316th meeting, at which a totally new set of quantity distance (QD) standards for HD 1.2 ammunition was approved. While the “old” standards are useable for the time being, DDESB has directed that the new standards be fully implemented not later than 1 Oct 03. This necessitates changes in the hazard classification (HC) system (TB 700-2, 5 Jan 98, Department of Defense Ammunition and Explosives Hazard Classification Procedures), which is being addressed by the joint hazard classifiers; changes to the Joint Hazard Classification System (JHCS) database, which are currently being designed and implemented; and the reevaluation of all facilities used for operations involving HD 1.2 munitions.

The revised standards apply an entirely new set of concepts for HC and siting of HD 1.2 ammunition and related facilities. The old criteria relied on maximum fragment throw distance taken from just one or a few tests of selected items, with other items classified by analogy. These tests were expensive and possibly non-repeatable. The QD rules associated with this HC methodology were based solely on this limited fragment throw data and made no allowances for variations in total quantity involved in an incident or the maximum credible event (MCE) for the items concerned. The revised standards account for these variables, both in the HC process and in QD siting. This approach makes HD 1.2 standards more consistent with HD 1.1, where fragment distance is based on a hazardous fragment density, rather than maximum fragment throw range. It also brings U.S. standards into much closer accord with North Atlantic Treaty Organization (NATO) standards.

The new system divides HD 1.2 into three subdivisions. Gone are the parenthetical fragment distances of the old days. Instead, we have HD 1.2.1 items, which contain more than 1.60 pounds of

explosives, 1.2.2 items with 1.60 pounds or less, and 1.2.3 items which are “unit risk” items – those almost qualifying as extremely insensitive explosives devices (EIDS). There are distance tables for each of these subdivisions based on the total net explosives weight (NEW) present.

Another feature of the new system is the determination of an MCE for each HD 1.2.1 item. The MCE is test derived or calculated from the “biggest bang” when a stack of the items is initiated by fire. Because we are dealing with HD 1.2 ammunition, we don’t expect the entire stack to go in one big explosion; but that doesn’t mean that the munitions will detonate just one at a time, either. The MCE is an estimate of just how big each of the sequential explosions will be. If this value exceeds 100 pounds, there is also a minimum fragment distance that must be applied to storage of these items in a structure that could create a secondary debris hazard.

A change to DAP 385-64, 28 Nov 97, Ammunition and Explosives Safety Standards, is being finalized to implement these standards within the Army. The new 1.2 subdivisions and MCEs will soon be available as additional fields in the JHCS. All future site plans should be evaluated using the new standards to prevent the need to resite facilities before the 1 Oct 03 mandatory implementation date.

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M-34 BLASTING MACHINES

The M-34 blasting machine, NSN 1375-00-567-0223, manufactured by Minowitz Manufacturing Company, has demonstrated a safety problem that could cause death, serious injury, or damage to equipment. The U.S. Army Tank-automotive and Armaments Command – Armament and Chemical Acquisition and Logistics Activity (TACOM-ACALA), located at Rock Island, IL, issued a safety of use message (SOU), ACALA 98-05, that deadlined these machines. The blasting machines which are affected are identified by a lot number which begins with “MMW...” on the bottom of the M-34 or any other blasting machine which cannot

be positively identified as manufactured by another company.

This information remains in effect until all affected M-34 blasting machines are turned in.

Voltage could be generated when the bail is released and the handle moves to the “ready” position or the handle is squeezed one time. The voltage generated is sufficient to fire a blasting cap, if attached. The problem is believed to be the result of age/wear and not considered to be a manufacturing defect.

Users must test each M-34 blasting machine affected by SOUM ACALA 98-05 in accordance with the following test procedure. Conduct this test each time an M-34 blasting machine is issued by supply for use or immediately prior to departing on a mission requiring its use.

Test procedure:

- a. Use either a digital voltmeter or digital multimeter which has a 20 volt DC range and 500 volt DC range or auto-ranging scale. Set meter to 20 volt DC scale.
- b. With handle in secured and latched position, attach a lead from the meter to one terminal of the M-34 and the remaining lead to the other terminal.
- c. Verify that the volt reading is less than one-tenth (0.10) volts.
- d. While observing the voltmeter, release the handle and allow the handle to come to its full, open position.
- e. A voltage reading greater than 0.10 volts indicates a defective blasting machine.
- f. Squeeze handle fully, one time, and release.
- g. A voltage reading greater than 0.10 volts indicates a defective blasting machine.
- h. A properly functioning M-34 unit will not generate a voltage at its output terminals during the first full squeeze of the handle. When the handle is squeezed between 2 and 6 times, the M-34 will generate an output pulse that may exceed 300 volts DC.
- i. Defective M-34 blasting machines have demonstrated a reading of over 20 volts DC generated from a partial squeeze of the handle.

For further information, contact the following TACOM-ACALA personnel: Messers. Doug Heritage, DSN 793-1709; Randy Lange, DSN 793-3160; or Juan Fernandez, DSN 793-6820.

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MITIGATION OF GLASS HAZARDS

A common concern during the siting of explosives facilities is the protection of workers from the hazards of flying glass. Recently, a new remedy for these hazards was approved by the Department of Defense Explosives Safety Board (DDESB). The method involves the use of special curtains that catch glass shards and drop them to the floor. The product is called “SafetyDrape” and is manufactured by a company called Skyline Mills. Intellimar, Inc., handles marketing of SafetyDrape. Requests for information about the product itself should be directed to Intellimar, Inc., P.O. Box 1074, Columbia, MD 21044, phone (301) 596-8500, datafax (301) 596-8853, e-mail intellimar@home.com, website <http://www.intellimar.com>

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